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I.—*On the Solan Goose, or Gannet* (*Sula bassana*, *Linn.*). By
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(Plate I.)

THE earliest reference to this well-known bird with which I am acquainted, is to be found in the celebrated Anglo-Saxon Chronicle, a work generally acknowledged to have been the result of the labours of a number of successive hands, and recounting the events which occurred from Cæsar's invasion to shortly after the middle of the twelfth century. In the account of the events recorded as having taken place A.D. 975, there occurs the following passage:—

And þa pearð
eac aþræred
deop-mod hæleð
Oslac of eapde.
oþer yða-gepealc.
oþer ganoteꝝ bæð.

Then too was driven
Oslac beloved
an exile far
from his native land
over the rolling waves,—
over the ganet-bath.*

“Solendæ” are also briefly mentioned by the father of Scottish history, John de Fordun, in the sixth chapter of the first book of his ‘Scotichronicon’ †, as building in great numbers on the

* Edition by the Rev. J. Ingram, B.D. London, 1823.

† Johannis de Fordun Scotichronicon, cum Supplementis ac Continuatione Walteri Boweri, Insulæ Sanctæ Columbæ Abbatis: E Coddicibus MSS. editum. Edinburgi, 1747.

Bass Rock ; but the first detailed record of the habits of the species that we meet with occurs in the ‘*Scotorum Historiæ*’ of Hector Boece, published in 1526. In this curious and interesting old work we are informed that the Bass Rock, in the Firth of Forth, is inhabited by an immense quantity of birds, called Solands in the vernacular tongue, and not unlike those termed Water-Eagles (*aquilas aquatiles*) by Pliny ; that when they first arrive in the early spring, they collect wood for building their nests in such abundance, that the inhabitants of the island are thereby enabled to provide themselves with a stock of fuel sufficient to last them throughout the year ; that they feed their young with very delicate fish, which they obtain by diving with great velocity from the rock into the sea ; finally, that the young are a source of great profit to the lord of the castle, for a very valuable oil, of great service in curing diseases of the hip and other of the joints, is obtained from the fat lying beneath the skin and that associated with the internal parts.

The next historian of the bird appears to have been William Turner, an English physician and naturalist, of considerable note in his day. In a small octavo volume on the birds made mention of by Pliny and Aristotle*, which he published at Cologne in 1544, he tells us that the “solend guse,” is a sea-bird, “ex uenatu piscium uictitans,” a little less than the Bernicle, but a veritable Goose as regards form and voice ; that it builds on the high cliffs of the Bass island, in the Scottish sea, but nowhere else in Britain ; that it tends its young with such affection that when boys are let down the face of the rock by means of ropes, for the purpose of carrying them off, it attacks them with great ferocity ; and that from its fat the Scots make an ointment which is regarded as of great value in the treatment of many diseases.

Conrad Gesner, in the third book of his ‘*Historiæ Animalium*’†, which appeared eleven years subsequently to the

* Avium præcipuarum, quarum apud Plinium et Aristotelem mentio est, brevis & succincta historia. Colonia, 1544.

† Conradi Gesneri Tigurini, medici & Philosophiæ Professoris in Schola Tigurina, Historiæ Animalium Liber III. qui est de Avium natura. Tiguri, MDLV. p. 158.

publication of Turner's work, commences his description of the Solan Goose with a quotation from that author, and then goes on to state that he has learned from an erudite Scotchman that these geese, called Solan Geese, exceed the domestic geese in length, but are not so broad; that they lay their eggs on rocks and cover them with one foot during the process of incubation, whence, perchance, the origin of the name Soland, "*à solea, id est planta pedis*;" and that the old birds feed their young with fish, in the selection of which they evince considerable discrimination, for, if after they have caught one fish, they see another which they regard as superior to it, they reject the first and secure it. He then concludes by quoting the passage from Hector Boece, of which we have shortly before spoken. In the same year in which Gesner's work was published, Olaus Magnus issued his '*Historia de Gentibus Septentrionalibus*'*; and in it is contained an account of the bird, which, though it does differ very materially from those of previous authors, nevertheless provides us with a few additional particulars regarding its habits, which I subjoin:—"Hæ anates in vere turmatim à Meridie in rupem de Bass quotannis veniunt, & rupem duobus, vel tribus diebus circumuolitant: quo in tempore rupem inhabitantes, nulum tumultum faciunt. Tunc nidificare incipiunt, & tota æstate manent, ac piscibus viuunt: & incolæ rupis, piscibus ab illis captis pascuntur. Ascendunt enim illarum nidos, vt superius de pullis aquilæ dictum est, & ad libitum pisces acceptant. In capiendis autem piscibus mirabilis est huius auis industria. In fundo maris lynceis oculis piscem contemplatur: contra quem se præcipitat, sicuti contra ardeam nisus: quem protinus ore et vngulis extrahit. * * Iuniores anates, aut anserculos in terra vicina vendunt. * * In fine autumnii rupem triduo circūuolant & postea agminatim ad partes Meridionales pro tota hyeme auolant, vt illic viuant in æstate: quia quando nobis est hyems, Meridionalibus est æstas. Diutissimè hæ anates viuunt: quod per quasdam signatas incolæ perpenderunt. Triginta, aut quadraginta in rupe bellatores harum auium fructus alit, & domino rupis nonnihil vectigalis penditur."

* Olaus Magnus, *Historia de gentibus septentrionalibus*. Romæ, 1555. Lib. XIX. de avibus, Cap. IX.—De mirabili generatione Anatum Scotiæ.

The Gannet is also briefly noticed by Dr. John Caius, in his tract, 'de rariorum animalium atque stirpium historia,' which was published in 1570. In speaking of the *Anser Brendinus*, he says: "Non est ergo Scotorum Bassanus anser, qui in Basse Scotorum Insula nidum ponit atq; oua, à qua nomen habet. In hanc insulã rupem existentem, nec in summo quantam Miluus oberret (vt Poëta dixit) sed exiguam, venturi stato anni tempore anseres, quo prius speculatu, qua obseruatione præmissis nuntijs vtantur quàm ingrediuntur: quò anni tempore hoc faciant, qua solitudine insulæ, concludentibus se incolis ad aliquot dies, donec se firmauerint anseres, ne abigant, quanta multitudine atq; densitate inuolent, sic vt in serenitate solem adimant, quot pisces afferant, quot oua pariant, & quantos fructus in annos ex eis anserumq; plumis atq; oleo percipiant insulani (nam Pupinorum pinguedinem habent atq; gustũ) longum esset recensere." Ulysses Aldrovandus devotes a chapter of his 'Ornithologia'* to the "Bass or Scottish Goose;" but he does not favour us with any original remarks on the subject, contenting himself by merely quoting the observations of Gesner and Boece.

The next account of the bird, in so far as I am aware, is that given by Clusius, in the 'Auctarium' to his 'Exoticorum Libri'†, and entitled "Sula Hoieri." He states that the specimen from which it was taken was obtained in the year 1605, in the Færœ isles, where it is called "Sula," and that he himself is doubtful whether it ought to be classed among the Gulls or the Geese, but that the friendly reader can settle the point to his own satisfaction. His description of the dimensions and plumage, which will be seen to be tolerably correct, is as follows: "Ab imo collo ad ouropygium usque ductâ per dorsum mensurâ pedem Romanum longa erat; à capitis vertice ad dorsum usque, uncias undecim, colli ambitus totidem crassus erat; rostri, quod valde mucronatum & firmum habebat, longitudo, unciaë quinque cum semisse: rostri pars crassior, & quæ circa oculos,

* Ulyssis Aldrovandi Ornithologiæ tomus tertius ac postremus. Lib. XIX. Cap. XX.—De Ansere Bassano sive Scotico (p. 162).

† Caroli Clusii Atrebatensis Exoticorum Libri decem. (Antwerp) 1605 (p. 367).

nigra erat: corporis ambitus viginti quatuor uncias, hoc est, binos pedes Romanos explebat, alæ plus quàm pedem longæ, caudæ verò longiores pennæ septem unciarum longitudinem non superabant; crura satis tenuia & infirma habebat, eaque binis unciis non longiora, & nigra prorsus coloris, ut etiam pedes, qui valde lati, quatuor digitis constantes, quorum exterior & illi proximus (qui longissimi) tribus articulationibus constabant, tertius duabus, minimus unâ, singuli parvo ungue præditi præter secundum, cujus unguis paullo latior, & altero latere serratus, omnes autem nigrâ membranâ simul connexi: longiores porrò & remiges alarum pennæ totæ nigræ, ut etiam tres illæ quæ in caudâ inferiores et longiores, mediumque caudæ locum occupantes*: reliquum corpus albæ pennæ tegebant; quæ tamen in dorso, non nihil subflavescebant, tamquam luto aut pulvere conspersæ fuissent."

Forty-five years later we find a notice of the Gannet in Jonston's 'Historia Naturalis de Avibus' (p. 94). It contains but little additional information regarding it, beyond the fact that the flesh is hard and dry, as the author can state from personal experience of it derived in the course of a visit to Scotland in 1623; but it is accompanied by a most remarkable figure, bearing the title of "*Schotisch Gans*" and representing a singularly hideous bird, with huge nostrils and tarsi armed with formidable spurs†.

In the well-known 'Exercitationes de Generatione' of the celebrated William Harvey, which was published in 1651, there is a very interesting passage (p. 30), descriptive of the nidification of the Gannet on the Bass Rock. We are there informed that the surface of the island in the months of May and June is almost entirely covered with nests, eggs, and young birds, so as to render it almost impossible to avoid trampling on them; that such is the density of the flight of the old birds in the air, that like a cloud they darken the sun and the sky; and that the

* This statement, as to the occurrence of black feathers in the tail is rather curious, reminding one of the South African *Sula melanura*. It is probably an indication of youth.

† [This is a reduced copy from Aldrovandi's figure, *Ornith. &c.*, tom. i. p. 163.—ED.]

screaming and din are such that you can hardly hear the voice of one who addresses you. He afterwards proceeds to make some observations on the white crust covering a very considerable portion of the rock (caused by the excrement of the Gannet and other sea-birds), remarking that it is so hard and solid and adheres so intimately to the rock, that it might readily be mistaken for the natural soil of the place. In the magnificent geographical work of Blaeu*, published at Amsterdam in 1662, we find two detailed and, on the whole, very accurate notices of the Solan Goose. In the first of these, which occurs in the course of a description of "Lauden," or "Lothien," it is stated (p. 40) that at a particular time of the year sea-birds like Geese, and thence so called, arrive from foreign parts and establish themselves on the Bass Rock, where they deposit their eggs and hatch their young. These birds are found nowhere else in the whole of Europe, another rock in the Firth of Clyde† excepted. There is such a quantity of them that they are a source of great profit to the proprietor of the island; for not only is their flesh fit for food, but their feathers serve for making mattresses. They come to the island about the middle of April, and take their departure about the middle of September; but previously to their arrival in flocks they send before them solitary individuals to act as scouts. They only produce one egg at a time, which they dexterously place on one end and keep warm with one of their feet, rarely or never deserting it till the young bird is hatched, and this because if it is temporarily left, and then moved by any person from its original position, it is impossible to replace it so as to remain firmly upon the rock, and the bird is therefore obliged to lay another in its place. It is peculiar to these birds that they cannot fly out of sight of the sea, hence they are often caught when driven inland by the force of the wind. The young, when they attain the magnitude of the domestic goose, are sweet and fit for eating, but the flesh of the old birds is hard, lean, and dry. The inhabitants of the island collect their nests, using them as fuel. The following

* *Geographiæ Blavianæ Volumen sextum, quo Liber XII, XIII, Europæ continentvr. Amstelædami. Labore & Sumptibus Joannis Blæu.*

† It is almost needless to say that Ailsa is referred to.

origin of the name Solan is then given, and will be seen to differ from that commonly adduced:—"Hi anseres nomine vulgari è Latino, ut puto, detorto, Solen vocantur, quod male pronunciant Soland, id est, anniversarii: ad nos enim veniunt semel unica solum vice in toto anno." The second passage relating to the bird is to be found in the account of the islands of the Firth of Forth (p. 90), and contains the following additional particulars:—"Edinburgenses 25 sc. solvunt pro uno anserē. * * coloris subcinericei sunt juniores, adulti albi, oblongum habent collum more gruis, rostrum acutissimum majoris digiti longitudine, & flavo colore. * * Os, quod vulgo *de Bril** appellamus, in aliis avibus separari ab osse pectoris potest, in hoc vero minime, ita ut nulla vi avelli queat, ideo illi annexum, ne in pontum desiliens, dum haleces sectatur, nimia sua violentia collum rumpat. * * Multi tamen ex iis hoc modo interimuntur; Asserem nautæ glabrum lævigant & dealbant, eique haleces annectunt, quem asserem loco puppis cymbæ alligant, & quem Anseres videntes & arripere rostro conati, rostrum tam firmiter asseri impingunt, ut illud evellere nequeant, sed capiantur, aut potius se ipsos capiant."

The Gannet is mentioned several times by Ray, in his 'Itineraries.' He informs us that on the 19th August, 1661, on his way to Leith he "viewed Tontallan Castle, and passed over to the Basse Island, where we saw on the rocks innumerable of the soland geese. The old ones are all over white, excepting the pinion or hard feathers of their wings, which are black. The upper part of the head and neck, in those that are old is of a yellowish dun colour; they lay but one egg apiece, which is white and not very large. They are very bold and sit in great multitudes till one comes close up to them, because they are not wont to be scared or disturbed. The young ones are esteemed a choice dish in Scotland, and sold very dear (1s. 8d. plucked). We eat of them at Dunbar. They are in bigness little inferior to an ordinary goose. The young one is upon the back black, and speckled with little white spots, under the breast and the belly gray. The beak is sharp-pointed, the mouth very wide and largè, the tongue very small, the eyes

* The furculum.

great, the foot hath four toes webbed together. It feeds upon mackrel and herring, and the flesh of the young one smells and tastes strong of these fish." The same author also records, in the course of his peregrinations in England, that he "saw many of those birds, which they call gannets, flying about on the water. This bird hath long legs, and a long neck, and flieth strongly. Possibly it may be *Catarractes**. He preys upon pilchards, the shoals whereof great multitudes of these fowls constantly pursue." Elsewhere we are told that they are captured "by tying a pilchard to a board, and fastening it so that the bird may see it, who comes down with so great swiftness for his prey, that he breaks his neck against the board."

Sir Thomas Browne, in his 'Account of Birds found in Norfolk'†, mentions "A large and strong-billed fowl, called a ganet, which seems to be the greater sort of *larus*; whereof I met with one killed by a greyhound, near Swaffham; another in Marshland, while it fought, and would not be forced to take wing: another entangled in a herring-net, which, taken alive, was fed with herrings for a while. It may be named *larus major*, *leucophæopterus*; as being white and the top of the wings brown."

The account of the bird given by Willughby, in his 'Ornithology'‡, published in 1676, is brief but interesting, inasmuch as the peculiar attachment of the skin to the muscles, in consequence of the interposition of air-sacs, is for the first time taken notice of. He says, "the skin is very full, sticking loose to the flesh." Of the habits of the Gannet, as seen at St. Kilda, Martin seems to have been about the earliest observer. In his interesting little work 'A late voyage to St. Kilda, the remotest of all the Hebrides of Scotland,' published in 1698, we find the following quaint account of its habits:—"The *Solan* Geese hatch by turns; when it returns from its fishing, it carries along with it five or six herrings in its gorget, all entire and undigested: upon whose arrival at the nest, the hatching fowl puts its head in the

* Ray does not appear to have been aware that the Gannet and Solan Goose were the same bird.

† Sir Thomas Browne's Works. Wilkin's edition, vol. iv. p. 314.

‡ Book III. Part III. section II. chap. II. (pp. 328, 329).

fisher's throat, and pulls out the fish with its bill as with a pincer, and that with a very great noise, which I had occasion frequently to observe. They continue to pluck grass for their nests from their coming in March till the young fowl is ready to fly in August or September, according as the inhabitants take or leave the first or second eggs. It's remarkable of them that they never pluck grass but on a windy day, the reason of which I enquired of the inhabitants, who said that a windy day is the *Solan Goose's* vacation from fishing, and they bestow it upon this employment, which proves fatal to many of them, for after their fatigue they often fall asleep, and the inhabitants laying hold on this opportunity are ready at hand to knock them on the head. Their food is herring, mackrels, and *syes*; English hooks are often found in the stomachs both of young and old *Solan Geese*, though there be none of this kind used nearer than the Isles, twenty leagues distant; the fish pulling away the hooks in those isles go to St. Kilda, or are carried by the old geese thither; whether of the two the reader is at liberty to judge.

“The *Solan Geese* are always the surest sign of herrings, for wherever the one is seen the other is always not far off. There is a tribe of barren *Solan Geese* which have no nests and sit on the bare rocks; these are not the young fowls of an year old, whose dark colour would soon distinguish them, but old ones, in all things like the rest; these have a province, as it were, allotted to them, and are in a separated state from the others, having a rock two hundred paces distant from all other, neither do they meddle with or approach to those hatching, or any other fowls. They sympathize and fish together: this being told me by the inhabitants, was afterwards confirmed to me several times by my own observation.

“The *Solan Geese* have always some of their number that keep centinel in the night-time, and if they are surprised, as it often happens, all that flock are taken one after another; but if the centinel be awake at the approach of the creeping fowlers, and hear a noise, it cries softly, *Grog, Grog*, at which the flock move not; but if this centinel see or hear the fowler approaching, he cries quickly, *Bir, Bir*, which would seem to import danger, since immediately after all the tribe take wing, leaving the fowler empty

on the rock, to return home *re infectâ*, all his labour for that night being spent in vain. Here is a large field of diversion for *Apolonius Tyanaeus*, who is said to have travelled many kingdoms over, to learn the language of beasts and birds.

“Besides this way of stealing upon them in the night-time, they are also caught in common gins of horse-hair, from which they do struggle less to extricate themselves than any other fowl, notwithstanding their bigness and strength ; they are also caught in the herring loches, with a board set on purpose to float above water, upon it a herring is fixed, which the goose perceiving, flies up to a competent height until he finds himself making a straight line above the fish, and then bending his course perpendicularly, piercing the air as an arrow from a bow, hits the board, into which he runs his bill with all his force irrecoverably, where he is unfortunately taken. The *Solan* Goose comes about the middle of March with a *south-west wind*, warm snow, or rain, and goes away according as the inhabitants determine the time, *i.e.*, the taking away or leaving its egg, whether at the first, second, or third time he lays.

“They preserve the *Solan* Geese in their pyramids for the space of a year, slitting them in the back, for they have no salt to keep them with. They have built above five hundred stone pyramids for their fowls, eggs, &c.

“We made particular enquiry after the number of the *Solan* Geese consumed by each family the year before we came there, and it amounted to twenty-two thousand six hundred in the whole island, which they said was less than they ordinarily did, a great many being lost by the badness of the season, and the great current into which they must be thrown when they take them, the rock being of such an extraordinary height that they cannot reach the boat.”

In Martin's subsequent work on the Western Islands, published in 1703, we are favoured with some additions to our knowledge of the habits of the bird and the uses that are made of it. He states, as illustrative of its indiscriminate employment of materials in the construction of its nest, that the steward of St. Kilda told him that in one nest had been found a red coat, and in another a brass dial, an arrow, and some Molucca beans. He also says

that “the natives make a pudding of the fat of this fowl in the stomach of it, and boil it in their water-gruel which they call Brochan; they drink it likewise for removing the cough: it is by daily experience found to be an excellent vulnerary.”

In O’Flaherty’s ‘West or H-Iar Connaught,’ written in 1684, and published by the Irish Archæological Society in 1846, there occurs (p. 12) the following notice of the bird:—“Here the ganet soares high in the sky to espy his prey in the sea under him, at which he casts himself headlong, and swallows up whole herrings in a morsell. This bird flys through the ships’ sailes piercing them with his beak.”

An account of the Gannet is given by Sir Robert Sibbald in his ‘History, ancient and modern, of the Sheriffdoms of Fife and Kinross, with the description of both, and of the Firths of Forth and Tay, and the Islands in them’*, which was published at Edinburgh in 1710; but as it contains no information which does not occur in the works of his predecessors, it is unnecessary to say more with regard to it. Albin describes the bird in the first volume of his ‘Natural History of Birds,’ which made its appearance in 1738. He remarks correctly that it “has no Nostrils, but in their stead a Furrow extended on each Side through the whole Length of the Bill.” The illustration which accompanies his description is remarkable, for the bird is represented as having five toes!

The next account of the Solan Goose deserving of notice occurs in Bishop Pontoppidan’s ‘Natural History of Norway,’ which was published in 1752, and translated into English three years subsequently. “The Hav Sule,” the worthy bishop informs us, “is a large Sea-bird which somewhat resembles a Goose: the head and neck are rather like those of a Stork, excepting that the bill is shorter and thicker, and is yellowish; the legs are long†; a-cross the back and wings the colour is a light blue; the breast and long neck are white; towards the head it is green mix’d with black, and on the top there is a red comb: the tail and wings are both distinguished by some white feathers at the ends,

* Part II. chapter II. p. 47.

† [The translation is here very loose. In the original the sentence stands more correctly, being “The legs are as in a Skarf,” i. e. *Phalacrocorax*.—ED.]

and are large in proportion to the body: when the wings are spread, from the end of one to the other they measure six feet. This bird is eatable either roasted or salted: the Scots call it Gentelman. It is a Bird of passage, or of the wandering unsettled sort. It is not seen in this country before the latter end of January, or beginning of February, when the herring-fishing begins, and then it serves for a sign to give notice of the season. They do not come nearer land than within half a mile; thus the farmer observes when the fish seek the narrow and shallow waters. At Easter these birds are not seen any more, therefore I cannot say much about their breeding. They are so stupid that by laying a few herrings upon a floating board, they may be inticed to the boat and killed with the oar.”* A most amusing figure of the bird is given which exhibits the comb on the head very distinctly.

In the ‘Systema Naturæ’ the Solan Goose constitutes the fifth species of the genus *Pelecanus*, and is thus characterized: “*P. cauda cuneiformi, corpore albo, rostro serrato, remigibusque primoribus nigris, facie carulea, * * Habitat in Pelago septentrionali, vix appropinquans littora per 2 milliaria; indicat Halecum adventum, quem sequitur Gentleman s. Jaen von Gent dicta*”†.

The last account of the Solan Goose in the works of the older authors to which I shall advert occurs in Walker’s ‘Essays on Natural History and Rural Economy,’ under a description (p. 308) of the Bass and its productions. In the course of his remarks on the habits of the bird, this writer quotes Harvey’s account of its nidification, and then goes on to say that his inquiry with regard to certain particulars contained therein had found them to be fabulous, for the keeper informed him that the birds “do not stand upon their egg, as is commonly reported, but sit upon it with their breast, which we saw indeed, like other fowls, but one of their feet is always folded under them upon the egg. Neither is it poised upon its end, but lies upon its side, and they turn it like other fowls.”

* The Natural History of Norway, part. II. Translated from the Danish Original of the Right Revd. Erich Pontoppidan, Bishop of Bergen in Norway, p. 76.

† Editio Duodecima Reformata. Holmiæ, 1766.

Having thus passed in review the various notices of the Solan Goose which are to be met with in the works of the more celebrated of the earlier authors, we may now proceed to offer some observations on our present knowledge of its natural history. The Gannet, or Solan Goose, is the *Anser Bassanus* or *Scoticus* of Gesner, Aldrovandus, Jonston, Willughby, and the greater number of the older authors; the *Sula Hoieri* of Clusius, Willughby and Ray; *Pelecanus Bassanus* of Linnæus, Gmelin, Latham, &c.; the *Sula Bassana* of Brisson and modern authors in general; the *Sula alba* of Meyer, Temminck, and Fleming; the *Weisser Tolpel* of Mayer; the *Bassanische Pelikan* of Bechstein; and the *Fou blanc* and *Fou de Bassan* of French authors. Its popular names are as follows: in English it is termed Gannet and Soland Goose; in Welsh, Gan; in Gaelic, Sulair and Guga; in Norse, Sula and Hafsula; in Greenland, Konksuk; in German, Solendgans and Schottengans; in Dutch, Jaen van Gent; and in French, le Fou.

The name Gannet is intimately connected with our modern English Gander, both words being modifications of the ancient British "gan" or "gans," which is the same word with the modern German "Gans," which in its turn corresponds with the old High German "Kans," the Greek $\chi\eta\nu$, the Latin *anser*, and the Sanskrit "hansa"*, all of which possess the same signification, viz. a Goose. The origin of the names Solan or Soland, Sulan, Sula, and Hafsula, which are evidently all closely related, is not so obvious. Martin informs us that "some imagine that the word Solan comes from the Irish Souler, corrupted and adapted to the Scottish language, *qui oculis irretortis e longinquo respiciat prædam*." The earlier writers in general derive the word from the Latin *solea* in consequence of the bird's supposed habit of hatching its egg with its foot; and in a note intercalated into Ray's description

* [This word, though applied to a different bird and in a slightly different form, has probably survived to our own time. "Hanser" or "Hernser" (with the still further corruption, as in the old proverb, of "Handsaw") is now-a-days in many places the common name for *Ardea cinerea*, and seems as if it could be hardly anything else than the Sanskrit "hansa." If so, "Heronshaw," abbreviated to "Heron" and "Hern," is naturally from the same root.—ED.]

of the Solan Goose in the edition of his Itineraries published by the Ray Society and edited by Dr. Lankester, we are told, though no authority for the statement is given, that "the Gannet, *Sula alba*, should be written Solent Goose, *i.e.*, a channel goose"*.

The geographical distribution of the Solan Goose is extensive, although its breeding-places are far from numerous. On the coasts of Great Britain and Ireland it appears probable that it is a constant resident, though varying its stations at different times of the year. The localities in which it breeds are limited to Lundy Island, off the coast of Devon, in the British Channel; the Skelig Isles, on the coast of Kerry, in the west of Ireland†; St. Kilda‡, the most distant of the Outer Hebrides; the Stack of Suliskerry, not far from the Orkneys; Ailsa Craig, at the mouth of the Firth of Clyde; and, last, though not least, the Bass Rock, in the Firth of Forth. Among those parts of the kingdom where it is frequently met with, though it does not breed, are off the coast of Cornwall and in the English Channel generally, various portions of the coasts of Scotland, and the Orkney Isles, where, according to Low, it is very abundant, fishing in great numbers in the numerous bays with which they are indented. Beyond the British Isles the Solan Goose enjoys a wide range, being extensively spread over the northern regions of the Old and New Worlds. In the north of Europe its breeding-stations are Myggenes, the most westerly of the Færoe Isles, and various small islands off the coast of Iceland, of which Grimsey, the Reykjanes Fuglaskér, and some of the Vestmannaeyjar are the principal. It is occasionally met with off the coast of Norway§. Southwards it appears on the shores of

* [This appears to be a suggestion of Yarrell's, who contributed the ornithological remarks inserted by Dr. Lankester, and is repeated by that author (B. B. 3rd ed. iii. p. 493, *note*). It seems at least as probable that the "Solent" took its name from the bird.—ED.]

† [It has also been supposed that the Gannet breeds on the Stags of Broadhaven, off the west of Mayo (Thompson's B. Irel. iii. p. 264, *note*).—ED.]

‡ [The most recent, as well as the most detailed account of this station (which, however, is actually on the islet of Borrera) is that given by Sir William Milner in the 'Zoologist' for 1848 (pp. 2054–2062).—ED.]

§ Cf. Ibis, 1865, p. 497, *note*.

Holland and France, on the coasts of Spain and Portugal, in the Mediterranean, and off Madeira. Further south than this it seems to give place to the *Sula melanura**. As in Europe, so in America, the breeding-stations of the Gannet are but few in number, being restricted, in so far as I am aware, to an island or islands in the Bay of Fundy, and to four rocks in the Gulf of St. Lawrence, viz. the Great Bird or Gannet Rock, the Little or North Bird Rock, Percé Rock near Gaspé, and Gannet Rock near Mingan. It is of common occurrence on the shores of the United States, and on the north-west coast of the continent; and it is also met with in Greenland, though very rarely, according to Fabricius, who states that it does not breed there.

In endeavouring to give an outline of what is now known of the habits of the Solan Goose, it will be convenient to treat of it as separately noticed in its principal European and American localities; and I shall begin with some remarks on it as seen at the earliest-known habitat of the bird, the Bass Rock, where I have had an opportunity of personal observation. The form and appearance of this celebrated island have been so often and so elaborately described that a very few words will suffice to say all that is necessary on the subject. It is about two miles distant from the southern shore of the Firth of Forth, and three from the venerable town of North Berwick, rises to the height of 420 feet above the level of the sea, and is formed of a huge mass of trap of a character intermediate between greenstone and clinkstone. Its sides rise bold and perpendicular, and on the east and west may be seen the opposite openings of a cavern 30 feet high and 170 feet long, which owes its existence to the hollowing agency of the sea. Its "sloping acclivity," to employ the words of the late Hugh Miller, "consists of three great steps, or terraces, with steep belts of precipice rising between;" of these "the lowest is occupied by the fortress, and furnishes, where it sinks slopingly towards the sea on the south-east, the two landing-places of the island." The middle, situated exactly

* The poet Robert Browning furnishes us with rather a curious illustration of a mistake arising from ignorance of the habits and distribution of the bird; for in Part III. of 'Paracelsus' we find Festus referring to his son "Aureole's glee when some stray Gannet builds amid the birch-trees by the lake" of Geneva!

over the cave, has furnished the site of the ancient chapel of the island, while the upper and largest was once occupied by the garden. The principal birds that breed on the Bass are the Solan Goose, the Foolish Guillemot (*Uria troile*), the Kittiwake (*Larus rissa*), the Cormorant (*Phalacrocorax carbo*), the Shag (*Phalacrocorax graculus*), the Razorbill (*Alca torda*), the Herring-Gull (*Larus argentatus*), the Common Gull (*Larus canus*), the Great Black-backed Gull (*Larus marinus*), and the Puffin (*Fratercula arctica*). The Black Guillemot (*Uria grylle*) is mentioned by Ray, but has not, I believe, been seen by subsequent observers; and the Peregrine Falcon (*Falco peregrinus*) and Eider-Duck (*Somateria mollissima*), which used to build on the island, have for some time disappeared.

The Solan Geese are met with in great numbers on all the several faces of the rock, and one or two colonies occur near the landing-places. Macgillivray estimates the number which he saw on the occasion of a visit to the island in 1831 at about twenty thousand; and, judging from the multitudes I saw when I visited it in 1862, I do not think there has been any material decrease since that time. The Gannets make their appearance about the middle of February or beginning of March, and, as a general rule, take their departure in October. A few, however, seem to remain throughout the winter; for they are not unfrequently seen during that season by the fishermen of the Firth, and towards the close of last December I obtained a full-grown individual which had been caught in a herring-net. The nests were described by the older observers as built of sticks; but either they were mistaken or the Geese have changed their customs; for nowadays, as I can testify from personal observations, they are constructed entirely of grass and seaweeds, particularly the *Fucus digitatus* and other of the common Fucoids. They are built in the form of a flattened cone, the base of which "is about 20 inches in diameter, with a shallow terminal cavity;" and their artificers exhibit great industry in collecting materials for them, tearing up grass and turf with their powerful bills, and frequently engaging in conflicts with one another during the process.

They lay but one egg; but if it is removed another is depo-

sited in its place. It is of an elliptical form, with a dull rough surface, and in its original state is white, but is almost always more or less patched with yellowish-brown dirt, although I have never seen it stained with blood, as is frequently the case with the egg of the American bird, according to Dr. Bryant. I have been informed on good authority that the albumen does not become white when it is boiled, but remains clear and colourless; but I cannot speak from personal knowledge of the fact. According to Macgillivray "it is subjected to what might appear rough usage, for the bird in alighting, flying, or when disturbed by human visitors tosses it about and stands upon it." This habit has probably given rise to the assertion that the egg is hatched by the foot.

The Gannet is but little adapted for progression on land, its gait being an awkward waddle. Judging from the descriptions of Selby and Macgillivray, these birds appear to have been in a very amiable state at the time of their visits to the Bass; for the former states that during incubation, "in consequence of being unmolested, they become very tame; and, where the nests are easily accessible upon the flat surface of the rock on the southwest side of the island, will allow themselves to be stroked by the hand without resistance, or any show even of impatience, except the low guttural cry of *grog, grog*;" while the latter author says that, when sitting, "the Gannets usually allow a person to approach within three feet, sometimes much nearer, so that one may touch them. When one approaches them they merely open their bill, and utter the usual cry, or they rise on their feet and express some degree of resentment, but little apprehension of danger." When I visited the island three years ago my experience was widely different; for the old birds manifested every symptom of displeasure, and even a young bird, but a few weeks hatched, squeaked angrily and made impotent demonstrations of self-defence with its soft little bill. Prof. Innes also, in a note to St. John's 'Natural History and Sport in Moray,' mentions (p. 204) an instance in which a young man suffered for his temerity in venturing to meddle with a gosling in the downy stage; for the infuriated parent made a swoop at his face, and, narrowly missing his eye, caught him by the nose. I can likewise bear witness

that the bird is capable of inflicting a most severe bite with the razor-like edge of its mandibles; for on one occasion, when a live specimen was brought to me, it made a cut between two and three inches long on the hand of its captor.

Macgillivray has well described the mode of flight of the Solan Geese in the following words:—"In launching from the cliffs, they frequently utter a single plaintive cry, perform a curve, having its concavity upwards, then shake the tail, frequently the whole plumage, draw the feet backwards, placing them close under the tail on each side, and cover them with the feathers. In some the feet were entirely covered, while in others parts of the toes were apparent. In flying the body, tail, neck, and bill, are nearly in a straight line; the wings extended, and never brought close to the body, and they move by regular flappings, alternating with regular sailings. In alighting, they generally ascend in a long curve, keeping their feet spread, and come down rather heavily, often finding it difficult to balance themselves, and sometimes, when the place is very steep, or when another bird attacks them, flying off to try it a second time." The Gannet appears to have considerable difficulty in taking wing when on low ground; and hence individuals which have flown inland and alighted are not uncommonly captured. Thus Willughby informs us that the bird he described "was taken alive near Coleshil, a market-town in Warwickshire;" and many similar instances are on record.

As has been truly said by a late eminent naturalist, "the early and more recent records of the Gannet are full of fond inventions;" and nowhere is this assertion more fully borne out than in the extravagant accounts that have been given regarding its power of diving. The late William Thompson, for example, in his admirable 'Natural History of Ireland,' states, on the authority of a post-master at Ballantrae, in Ayrshire, that Gannets have been taken in nets at depths of 180 feet in that neighbourhood. Now it seems entirely inconceivable that a Gannet, if ever it penetrated to such a depth, could ever come to the surface again; and even if it were capable of doing so, it is extremely improbable, to say the least, that it would take such an amount of trouble to procure prey that might be ob-

tained so much more easily. Several eminent authors have gone to the other extreme, and deny that the Gannet ever dives at all; but I can testify from personal observation that this is incorrect.

Owing to the extreme power of dilatation which its œsophagus possesses, the bird is capable of swallowing fish of very considerable dimensions. Its food, in the Firth of Forth and the other Scottish localities where it occurs, consists principally of herrings, and, in the English Channel, of pilchards. A specimen which I obtained last winter, and which was kept alive for a few days, was fed on herrings which had been previously extracted from the stomach of a Seal; these it swallowed very rapidly, head foremost. Its powers of digestion seemed to be vigorous; for on examining its stomach after it was killed it was found to be nearly empty, with the exception of cod-hooks, which must have been swallowed some time previously and were considerably worn. Not rarely it becomes so gorged with food as to be unable to rise from the surface of the water, on which it reposes in a lethargic state; and while in this condition it may be easily run down and captured if advanced upon in a boat. It is scarcely necessary to mention that the statement of Pennant and other writers, that the Gannet possesses a gular pouch similar to that of the Pelican, and capable of containing five or six herrings, is entirely without foundation. The old bird, according to Macgillivray, at first feeds its young "with a kind of fish soup prepared in its gullet and stomach, and which it introduces drop by drop, as it were, into its throat. But when its nursling is pretty well grown, it places its bill within its mouth and disgorges the fish either entire or in fragments. They never carry fish to the rock in their bills." The cry of the young bird is a shrill squeak, while that of the old bird is hoarse and resembles the syllables "carra carra" or "kurra kurra" rapidly repeated. From one to two thousand of the young birds are killed annually for sale, and, after being plucked, obtain a price of from sixpence to a shilling each. Formerly, when they were held in greater value, they used to fetch considerably more: thus we find that in Ray's time they cost 1s. 8d. apiece. At one time they figured at the tables of the Scottish

monarchs ; and more recently were much esteemed by the citizens of Edinburgh and other towns, being roasted and eaten as a relish before dinner. Now, I believe, their consumption is chiefly limited to the lower classes ; and I have been informed on good authority that, after being parboiled and having their legs cut off, they are sold in considerable numbers to the Irish peasants who come over to Scotland at harvest-time.

Ailsa Craig, the breeding-station of the Solan Goose in the Firth of Clyde, consists of a mass of columnar trap of a conical form, rising nearly 1100 feet above the level of the sea. It is about two miles in circumference, and there is only one point where it is possible to land. The north-west side is almost perpendicular, and composed of successive tiers of columns resembling those of Staffa, but on a larger scale ; while the other sides are clothed with grass, and gradually slope down to the level of the sea. The Solan Geese build in great numbers on the cliffs, and may be seen fishing in abundance in the neighbourhood.

St. Kilda, the outermost of the Hebrides, measures about three miles long and two broad. Its sides are formed of perpendicular precipices, rising in some parts to a height of 1300 or 1400 feet, and it possesses but one landing-place, situated on the south-east, which can only be reached in very propitious weather. The Solan Geese form one of the principal sources of the sustenance of the inhabitants, who make use of them in a variety of ways—the women, for example, employing their skin in the manufacture of shoes.

In Iceland, according to Faber, the Solan Goose is much more abundant in the south than in the north. It does not appear to breed on the mainland, and its principal stations are those islands which I have already mentioned. It comes to them towards the end of April, and builds a large nest, principally of seaweed, which it often brings from a considerable distance. The egg is deposited about the middle of May, and the young bird is hatched in the beginning of July. As in Britain, the birds leave their breeding-places in October, and spend the winter cruising about the sea-coasts.

Of the American breeding-stations of the Solan Geese we

owe our information principally to Audubon and Dr. Bryant, the latter of whom, in a paper in the 'Proceedings of the Boston Society of Natural History' (viii. p. 65), has given an excellent account of the localities in the Gulf of St. Lawrence. He says, "The northerly or highest half of the summit of Gannet Rock, and all the ledges on its sides of sufficient width, the whole upper part of the pillar-like portion of the Little Bird, and the greater part of the remaining portion of this rock, were covered with the nests of the Gannet at the time of my visit. On the ledges the nests were arranged in single lines, nearly or quite touching one another; on the summit, at regular distances one from the other of about three feet. Those on the ledges were built entirely of seaweed and other floating substances; on the summit of the rock they were raised on cones, formed of earth or small stones, about ten inches in height and eighteen in diameter when first constructed, presenting, at a short distance, the appearance of a well-hilled potato-field. I saw no nests built of *zostera*, or grass, or sods; the materials were almost entirely fuci, though anything available was probably used; in one case the whole nest was composed of straw, and in another, the greater part of manila rope-yarn. The nests on the summit of the Great Bird were never scattered, but ended abruptly in as regular a line as a military encampment. Through the midst of the nests were several open spaces, like lanes, made quite smooth by the continued trampling of the birds, which seemed to be used for play-grounds; these generally extended to the brink of the precipice, and reminded me very much of the sliding-places of otters.

"The birds were principally feeding on herring, but also on capelin filled with spawn, some fine-looking mackerel, a few squids, and, in one instance, a codfish weighing at least two pounds. The surface was swarming with a species of *staphylinus*, that subsisted on the fish dropped by the birds. Occasionally a nest could be seen in which the single egg had not been deposited, and perhaps one, in two or three hundred, with a newly laid one; on all the rest the Gannets were already sitting, and though none of the eggs were as yet hatched, many of them contained fully formed chicks. On being approached

the birds manifested but slight symptoms of fear, and could hardly be driven from their nests; occasionally one more bold would actually attack us. Their number on the summit could be very easily and accurately determined by measuring the surface occupied by them; by a rough computation I made it to be about fifty thousand pairs, and probably half as many more breed on the remaining portion of the rock and on the Little Bird."

Like most other birds, the Gannet is preyed upon by various parasitic insects of the order *Anoplura*. In the specimens which I have examined I found two distinct species in great numbers on the feathers of the fully fledged birds, and even on the naked skin of recently hatched individuals; and these on examination were found to be referable to the *Decophorus bassanæ* and *Lipensus staphylinoides* of Denny. Montagu describes a parasite from the cellular membrane of the skin under the name *Cellularia bassani*; but, though I have looked for it with care, I have not succeeded in meeting with it.

It would appear that the Gannet is a very long-lived species, as Mr. Selby was informed by the keeper of the Bass that he had recognized, from particular and well-known marks, certain individuals for upwards of forty years that invariably returned to the same spot to breed. It is likewise long in arriving at a state of maturity. Selby fixes the time as four years; but I was informed by the present tenant of the Bass that it is five, and, from the varieties in plumage which different individuals present, I can readily believe it. There has been some discussion as to whether the Solan Goose does or does not possess external nostrils; but, from a careful examination of specimens in every stage of growth, I have satisfied myself that they are never present at any period of its existence.

The young bird when first hatched is naked, and of a greyish slate-colour, which varies in intensity in different parts of the body. The space round the eye and the skin over the oil-gland are yellowish white; the bill is horn-coloured at the tip, and the upper mandible is provided with a scale, which soon disappears. The down begins to make its appearance very rapidly, but is at first confined to the upper parts. This stage of the nestling's

existence is represented in the accompanying figure (Plate I.), copied from a drawing of a living bird made by myself last summer. But the whole body soon becomes covered with a snow-white garment, over which the true plumage gradually extends, and in the course of between two and three months it is able to fly. For a considerable time after this period, however, small detached masses of down may be seen protruding through the feathers, more especially those of the head and neck. The plumage from this stage on to maturity is so well known that I need not occupy more valuable space in the description of it, and I therefore bring these remarks to a close.

II.—Notes on the Birds of Southern Texas.

By H. E. DRESSER.

[Concluded from 'The Ibis' for 1865, page 495.] ✓

COLUMBA FLAVIROSTRIS, Wagler. Red-billed Dove.

Common near Matamoras, breeding there. During the autumn, quantities of these birds, the two next species, and *Ortallida macalli* are brought to the market for sale. One I picked out of such a lot, on the 9th August, 1864, agrees with McCall's description of *Columba solitaria*, excepting that the neck and breast have reddish, instead of bluish metallic reflexions. I examined many at the market, but could find none differing from my specimen, except in size, and none answering more nearly to that description. At Brownsville this bird is not uncommon, but is found only a short distance towards the interior of Texas, and I noticed none higher up the Rio Grande than Roma.

A Mexican who shot Doves for the market told me that he had found this species breeding near the town of Matamoras, and that it builds a nest somewhat similar to that of *Zenaidura carolinensis*, and lays two eggs somewhat larger than those of that bird.

Bill coral-red at base and for rather more than two-thirds of its length, the tip being whitish; iris bright orange; the bare space round the eye and legs coral-red. Stomach containing a sort of blueberry. Length 13 inches; expanse of wings 23 inches.



Booby ad. viv. del
J. Wolf, del. et. lith

M & N Hanhart imp

SULA BASSANA. (*Juv*)